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An Analysis of Salary Versus Fee For Service General Practitioners, Inuvik Region, Northwest Territories

By

Andrew J. Lockhart

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A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the requirements for the degree of Master of Public Health

Department of Public Health Sciences

Edmonton, Alberta

Spring, 1999

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Degree: Master of Public Health

Year this Degree Granted: 1999

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Abstract

This study examined the practice patterns of salaried and fee for service general practitioners in the Inuvik Region of the Northwest Territories. It is a three year retrospective evaluation of administrative billing data from the Northern Health Information Management System.

The objective of the study was to determine if, in the Inuvik Region, the practice patterns of fee for service and salaried physicians differed. This study considered four practice pattern indicators: service intensity, billing intensity, propensity to recall, and billings from recall.

This study found statistically significant differences between the billing patterns of the two groups of physicians in each of the four indicators examined. In most cases, the fee for service group had significantly higher billings, service intensity and recall rates.

The study concludes that payment methods and their inherent economic incentives may influence physician practice styles.

Acknowledgement

To my best friend, Maria Mathews, whose constant advice and encouragement made this paper possible.

Table of Contents

1.0 Chapter 1 1
1.1 Introduction 1
1.2 Problem and Objectives 3
1.3 Rationale 4
1.4 Anticipated Findings and Hypotheses 4
1.5 Definitions 5
1.5.1 Fee For Service 5
1.5.2 Salary 5
1.5.3 Recall Visit 5
1.5.4 Locum Tenens 5
1.5.5 Practice Patterns 6
1.5.6 Nurse Practitioner 6
1.6 Limitations 6

2.0 Chapter 2 – Background 8
2.1 The Inuvik Region 8
2.2 The Health Care System in the Inuvik Region 8
2.3 Fiscal Restraint 10
2.4 Physician Services in the Inuvik Region 11
2.5 The Wotton Report 13

3.0 Chapter 3 – Literature Review 17
3.1 Fee For Service 17
3.2 Salary 17
3.3 Fee For Service Versus Salary – Previous Findings 18
3.4 Responses to Financial Incentives 19
3.5 Supplier Induced Demand 20
3.6 Summary 21

4.0 Chapter 4 – Methods 22
4.1 Permission to Conduct Study 22
4.2 Administrative Database 22
4.3 Data Preparation 25
4.3.1 Data Collection 25
4.3.2 Scrambling of Identification Numbers 25
4.3.3 Data Cleaning 26
4.3.4 Fee Adjustments 27
4.3.5 Preliminary Analysis for Sources of Error 27
4.4 Data Analysis 28
4.4.1 Service Intensity Analysis 29
4.4.2 Billing Intensity Calculation 29
4.4.3 Propensity for Recall Calculation 30
4.4.4 Billings From Recall Calculation 30
4.4.5 Most Common Services 30

4.4.6 Testing for Statistical Significance 31

5.0 Chapter 5 – Results 32
5.1 Physicians 32
5.2 Analysis of Aggregate Practice Patterns 33
5.2.1 Claims Submitted 34
5.2.2 Billings 34
5.2.3 Patient Visits 35
5.2.4 Summary of Aggregate Practice Patterns 35
5.3 Comparison on Practice Indicator 36
5.3.1 Service Intensity 36
5.3.2 Billing Intensity 37
5.3.3 Propensity for Recall 37
5.3.4 Billings from Recall 38
5.3.5 Summary of Practice Indicators 39
5.4 Changes in Practice Patterns Over Time 39
5.4.1 Service Intensity 39
5.4.2 Billing Intensity 40
5.4.3 Propensity for Recall 40
5.4.4 Billings from Recall 40
5.4.5 Summary of Changes in Practice Patterns Over Time 41
5.5 Comparison of Most Commonly Provided Services 41
5.6 Summary 44

6.0 Chapter 6 – Discussion 45
6.1 The Salary Programme 45
6.2 Fee For Service Physicians 45
6.3 Salary Physicians 47
6.4 Factors Influencing Practice Behaviours 50
6.5 Implications for the Organization of Physician Services 50
6.6 Limitations 52

7.0 Chapter 7 – Conclusions 55
7.1 The Current State of Physician Payment 55
7.2 Summary of Study Findings 56
7.3 Recommendations 58

8.0 References 61

List of Tables

Table 1. The Number of General Practitioners in the Inuvik Region. 32

Table 2. Monthly Full Time Equivalents of Fee for Service and Salaried Physicians in the Inuvik Region, 1993-1996. 33

Table 3. Practice Patterns of Fee for Service and Salaried Physicians in the Inuvik Region, 1993-1996. 34

Table 4. Practice Indicators of Fee For Service and Salaried Physicians in the Inuvik Region, 1993-1996. 36

Table 5. Practice Indicators of Fee For Service and Salaried Physicians in the Inuvik Region in 1993/94 and 1995/96. 39

Table 6. Most Common Services Provided by Fee For Service Physicians in the Inuvik Region, 1993/94 – 1995/96. 42

Table 7. Most Common Services Provided by Salaried Physicians in the Inuvik Region, 1993/94 – 1995/96. 43

1.0 Chapter 1

1.1 Introduction

This study examines the practice patterns of salaried and fee for service general practitioners in the Inuvik Region of the Northwest Territories. It analyzes administrative data of the Northern Health Information Management System (NHIMS). This study takes a system or payer perspective, specifically that of the Northwest Territories, Department of Health and Social Services, and the Inuvik Regional Health Board. It evaluates salary and fee for service physician remuneration according to the recommendations made in a 1993 review of physician services in the Inuvik Region.

1.2 Problem and Objectives

How should physicians be paid? This is a complex and contentious question to which there are no easy answers. Barnum et al. wrote that, "There is no single optimal method for the payment of providers. All methods generate both adverse and beneficial incentives effecting the volume, quality, and mix of services. The desirability of a specific approach depends on the economic, social and institutional context" (1995, 23-24). Any payment method is a trade-off between the advantages and disadvantages to payers, care givers, patients and the health system as a whole. The preference of one payment method over another depends on the unique needs and preferences of a given jurisdiction.

The method of payment is likely to have profound effects, not only on physician incomes but also on the cost and availability of physician services to people of all ages (Epstein and Blumenthal, 1993). Many analysts have been concerned that the current fee for service system has provided incentives for physicians to enter procedure oriented disciplines and to overuse technical services (Almy, 1981; Epstein, Begg and McNeil, 1986; Schroeder, 1979). Further, the current fee for service system encourages physicians to do more rather than fewer procedures (Epstein et al, 1993). If only because of the rising costs of medical care, the methods by which physicians are paid will come under increasing scrutiny by health policy makers.

In the Inuvik Region, patients and health administrators alike wanted physicians to remain in the North for longer periods of time and become more involved in activities such as community based health promotion, quality assurance, and cultural orientation. It was acknowledged that the incentives of a fee for service reimbursement mechanism did not align with the goals of the Territorial health system. As a result, in 1993, the Department of Health piloted a project to remunerate general practitioners in the Inuvik Region by salary.

The objective of this study is to determine if, in the Inuvik Region, the practice patterns of fee for service and salaried physicians differ. The study will consider four practice pattern indicators: service intensity (claims per visit), billing intensity (fees per visit), propensity to recall (the proportion of recall visits of total visits) and recall billings (proportion of recall billings of total billings).

1.3 Rationale

This study is an important and timely project for a number of reasons. It is an opportunity to evaluate the piloted physician payment strategy. Since 1993, the Inuvik Regional Health Board has recruited salaried physicians in an incremental fashion. Between 1993 and 1996 both salaried and fee for service general practitioners have worked in the Inuvik Region. This study is an opportunity to compare the practice patterns of fee for service and salaried physicians and evaluate the consequences of this new physician resource strategy.

Second, the government of the Northwest Territories, like other provincial and territorial governments is facing a limited health care budget. Administrators in the Department of Health and Social Services believe the Department is particularly vulnerable to federal funding cuts because it derives a larger proportion of its budget from federal transfers and a smaller proportion from tax revenue than other provinces (Personal Communication, 1996, Ken Lovely, Former Deputy Minister of the Department of Health and Social Services, Northwest Territories). Hence, the Department of Health and Social Services has undertaken a number of initiatives to reduce spending, including efforts to control physician generated costs (Department of Health and Social Services, 1996).

Third, methods of paying physicians may play a significant role in the types of services delivered and the rising costs of medical care. There is growing recognition that decisions made by physicians are an important determinant of medical resource use. It has been estimated that physicians direct seventy percent of the expenditures for all

personal health care services (Blumberg, 1978). The way physicians are paid for their services may influence a variety of issues, including the quality and cost of, as well as access to, medical care.

Finally, this study will begin to fill a gap in the literature regarding physician resource strategies in geographically remote and scarcely populated areas. At present, there are few published articles available about physician practice styles and remuneration methods in places such as the Northwest Territories. The few available articles are opinion rather than evidence based. The comparative dearth of published information in this area may be due in part to the small sample sizes and limited generalizability of such studies. Nonetheless, the circumstances in the Inuvik Region are found elsewhere in the Northwest and Yukon Territories as well as the northern regions of many Canadian provinces. For these regions, the findings and conclusions of this study may be particularly relevant and support evidence based decision making.

1.4 Anticipated Findings and Hypotheses

It is hypothesized that there are statistically significant differences in the practice patterns of fee for service and salaried physicians. Most probably in response to financial incentives, fee for service physicians will provide more services and have a greater proportion of recall visits of total patient visits. Because of loss of potential income, it is hypothesized that they will have less involvement in non-billable activities. As a result their billings will be greater than that of salaried physicians. It is also anticipated that the practice patterns of fee for service physicians will have changed since salaried physicians

were introduced into the Region. It is anticipated that there will be evidence of increased service provision per visit and increased recall visits in 1995 than in 1993. These findings may support the suspicion of supplier induced demand although proving this practice is beyond the scope of this study.

1.5 Definitions

1.5.1 Fee For Service.

Fee for service is the most common form of physician compensation in Canada whereby physicians are paid for each individual procedure or treatment according to a fixed fee schedule. Physicians compensated in this method usually work in private practice.

1.5.2 Salary.

This is a method of physician compensation whereby physicians are paid a fixed amount for a predetermined period of time irrespective of the number of patients attended or the number of procedures performed. This form of remuneration usually creates an employer-employee relationship.

1.5.3 Recall Visit

A recall visit is a patient revisit to a physician within the same episode of illness. The visit may be physician or patient initiated.

1.5.4 Locum Tenens.

This is a term describing a substitute, alternate, or fill-in physician who covers the duties of another physician for a defined period of time ranging from a few days to a number of months. The arrangement is temporary and common during physician

absences for illness, vacation or educational leave.

1.5.5 Practice Patterns.

Practice patterns are trends in physician practice behaviour determined by areas of medical interest and expertise as well as the demographics of the population base.

1.5.6. Nurse Practitioner.

A nurse practitioner is a registered nurse who has additional training in primary care and who is able to diagnose and manage illness and prescribe medications.

1.6 Limitations

This study is not a comprehensive evaluation of physician payment strategies in the Northwest Territories. It is from a system perspective and does not consider individual patient satisfaction or preferences. Moreover, the study assumes that the quality of care provided by the two groups of physicians is equal. Although it is anticipated that fee for service physicians will provide more services than salary physicians, the study does not assess the health status impact of these services, nor does it control for case mix. And finally, it does not consider if physicians induce demand. These issues are beyond the scope of this study.

The physician population for the Inuvik Region averages no more than eight full time equivalents over the course of any one-year. Because of the limited number of physicians in the study, the results may not be representative of physician behaviour in southern metropolitan jurisdictions.

Although the average physician population remained consistent over the course of

the three-year period, there was a certain amount of turnover. Of the eight physicians who were practicing at the beginning of the study, only three were still practicing as of March 31, 1996.

In addition to the fact that physicians changed during the course of the study, those that were reimbursed with a salary were not paid fee for service earlier in the study. The study does not include any one physician who was reimbursed under both methods; therefore, the results do not control for individual characteristics which may influence practice behaviour.

Despite these limitations, this study lays the groundwork for a number of future studies and is the first step in expanding our understanding of physician practice patterns and payment mechanisms in the Northwest Territories. In addition, it is the first study to use administrative data from the Northern Health Information Management System and makes important recommendations for future studies using this database.

2.0 Chapter 2 - Background

2.1 The Inuvik Region

The Inuvik Region is located in the northwest corner of the Northwest Territories. The Region extends from the south shore of Great Bear Lake to Banks Island in the Beaufort Sea. It includes twelve communities: Sachs Harbour, Tuktoyaktuk, Paulatuk, Inuvik, Aklavik, Fort McPherson, Tsiigehtchic (formerly known as Arctic Red River), Fort Good Hope, Colville Lake, Norman Wells, Tulita (formerly known as Fort Norman) and Deline (formerly known as Fort Franklin).

The Region is approximately half the size of Alberta, but in 1995, had a population of only 9282 (Mathews, 1996). The communities range in population of 75 to 3000 people. Five cultural groups live in the Region: the Inuvialuit, the Gwich'in, the Sahtu Dene, Metis, and non-aboriginal people. Aboriginal people form roughly two thirds of the total regional population (I.R.H.B., 1996).

Most of the Region is geographically isolated. Access by permanent road is available to only three communities during nine months of the year. Ten of the communities can be reached by barge during the summer months. Most communities are accessible primarily by air and as a result, travel is limited by cost; weather, and flight availability. Communication between communities is possible throughout the Region by either telephone, facsimile or bush radio.

2.2 The Health Care System in the Inuvik Region

Prior to 1988, the Medical Services Branch of Health and Welfare Canada

administered and delivered health services in the Northwest Territories. In 1988, responsibility for health services was transferred to the Department of Health of the Northwest Territories, which established six[1] regional health boards to deliver and administer services. Health services in the Inuvik Region were delivered through health centres or health stations located in each community and the Inuvik Regional Hospital located in Inuvik. Health centres are generally found in communities with populations greater than 200 people and health stations are located in communities with populations less than 200 people.

The community health nurse is the primary care provider and "gatekeeper" in all communities except Inuvik. The community nursing staff lead daily sick clinics, routine public health clinics, educational workshops and community development programs. They are also on call after regular hours to provide 24 hour emergency coverage. Each Community Health Station is staffed by a lay dispenser who, during emergencies assesses patients and provides treatment according to direction given by physicians or nurses located in larger centres. Each week, nurses from Fort Good Hope visit Colville Lake and the nurses from the Inuvik Regional Hospital visit Tsiigehtchic. Physicians visit each community either once a month or every six weeks (depending on the population of the community). In Inuvik, the physicians are the first contact and the "gatekeeper".

Patients are transferred to the Inuvik Regional Hospital to access specialist and

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[1] A health board was not established in the MacKenzie/Deh Cho Region. Health services were administered and delivered by the Northwest Territories Department of Health.

inpatient services[2]. The Hospital operates 26 acute care beds and 16 long term care beds and provides diagnostic, therapeutic, rehabilitative and preventative services for both the hospital and the community health centres patients. Individuals requiring additional health services are transferred to Stanton Yellowknife Hospital in Yellowknife or the Capital Health Authority in Edmonton.

2.3 Fiscal Restraint

Since 1988, the Department of Health and Social Services has seen significant growth in expenditures and recently has adopted a variety of measures to reduce the spending. One major initiative is the development of population based funding formulas to provide regional boards with consistent funding throughout the Northwest Territories, resulting in some significant reallocations of funds between the five health districts.

The second significant cost cutting measure was the implementation of across-the-board budgetary reductions for the fiscal year 1996-97 for all health boards. Budgets were globally reduced by ten percent. The health boards were given the responsibility of effecting the cuts in areas of their choice subject to some broad parameters and eventual approval by the Department of Health and Social Services.

The last major initiative was the amalgamation of the Departments of Health and Social Services. Headquarters in Yellowknife started its consolidation efforts in June 1994. Regional amalgamation was first effected as a pilot project in the Inuvik Region commencing in July 1995. The consolidation is now underway at the community level.

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[2] As of April 1 1995, residents of Deline, Tulita, and Norman Wells accessed hospital and specialist services from the Stanton Yellowknife Hospital in Yellowknife.

2.4 Physician Services in the Inuvik Region

Physician services in the Inuvik Region are available from fee for service physicians associated with a private medical clinic in Inuvik or from salaried physicians employed or contracted by the Inuvik Regional Health Board. Between 1993 and 1996 most fee for service physicians practiced in the private clinic or in the Inuvik Regional Hospital. One individual, stationed in Norman Wells, provided services to the five southernmost communities until 1995. Salaried physicians work exclusively in the hospital, and since 1995, in all community health centres and stations in the Region.

Although relations between the hospital, its physicians and physicians from the private clinic were good, there were still a number of points of contention. First of all, both groups of physicians covered the emergency/outpatient department on a rotational basis. Although the private clinic physicians billed fee for service when seeing patients in emergency they did not pay any overhead expenses to the hospital (e.g. for supplies or support staff).

Second, when fee for service physicians covered for emergency or outpatients, they would frequently book non-emergent patients and hold regular clinics at the hospital, again without contributing to overhead costs. Lastly, the fee for service physicians also had a tendency to book some of the more resource intensive examinations and diagnostic services at the hospital as opposed to their own private clinic (Personal Communication, November 18, 1996, Dr. C. MacNeil, Inuvik Regional Health Board). Thus, the fee for service physicians were able to effectively shift the burden of some of their overhead expenses onto the hospital. Further, the booking of non-emergent patients had a disruptive effect on the emergency department and staffing as a whole.

Physician services are available throughout the year in the town of Inuvik. In all other communities, physicians are available every four to six weeks for a two to four day period, depending on the size of the community and the flight schedule. Prior to employing salaried physicians, services to the outlying communities were paid for through a contractual arrangement to fee for service physicians. The per diem rate was $1000 (in addition to travel, accommodations and equipment costs) regardless of the number of patients seen. This arrangement with fee for service physicians was discontinued about half way through the study period. Claims were submitted by the Inuvik Regional Health Board. Despite the favourable remuneration, it was difficult to arrange physicians to fulfil these duties and some community visits were cancelled or delayed. Residents in the communities complained that the same physicians rarely visited the community twice and that the continuity of care was very poor.

Once salaried physicians were recruited, each was assigned a number of communities to which they provided the routine visits each month. Additional remuneration was not provided to salary physicians, as the community visits were considered a part of their regular duties. In addition to improving continuity of care, community visits became routine and rarely disrupted, except in the case of adverse weather conditions (Inuvik Regional Health Board, 1996).

In general, physician services were characterized by a high turnover in medical staff. At times in the past, services were provided by locum physicians who practiced in the north for short periods of time. A 1996 profile of the Inuvik Region reported that residents felt that the high turnover in medical staff resulted in poor patient care. Pregnant patients saw numerous physicians through the course of their pregnancy. Most

patients were not able to have a "family physician" to provide continuity of care (Inuvik Regional Health Board, 1996).

2.5 The Wotton Report

In 1993, Dr. Jane Wotton of the University of Manitoba was contracted to evaluate physician services in the Inuvik Region. During her investigation, she interviewed administrators from the Department of Health and Social Services and the Inuvik Regional Health Board, physicians and other care providers, and community leaders.

She reported that "medical practice in Inuvik was characterized by a wide range of clinical and surgical services, a high volume of patients and a core of experienced and technically skilled physicians. A general practice anaesthetist and general practice surgeon were on call at all times and the hospital in Inuvik could quickly respond to a wide range of emergencies" (Wotton, 1993, 9). The Report stated that the opportunity costs of running scheduled operating room time four mornings a week in a 26 bed hospital served by a few fee for service physicians were great. By this she meant that time is not available for physician input into other important areas and has contributed to undermining a more comprehensive approach to health which would be more relevant to the Region. The physicians described practice as stressful and hectic with scant incentive for long stay and little time to take part in routine rounds, committees, audits and meetings.

Communications between the communities and the health staff frequently focussed on problem cases and were occasionally confrontational. Physicians, with

notable exceptions, were remarkably absent from dialogue with the communities, which was described by nurses in the settlements as the most stressful part of their job.

The main health problems in the Region have been variously described by politicians, health professionals and people of the Region as alcoholism, sexually transmitted diseases, violence and abuse (Mathur and Barretto 1988; MacLachlan 1983; Canadian Journal of Community Mental Health 1983; Berger 1979). In this respect, what is happening in the Inuvik Region parallels what is going on elsewhere in the North - a second epidemic of teenage pregnancy, sexually transmitted disease, smoking and abuse superimposed on the still to be solved burden of infectious disease (Rodgers 1980; Young 1988; Postl and Moffat 1988; Robinson 1985; Wotton 1981). Some physicians believe that the solution to the hectic clinical pace is additional surgeons and anaesthetists. Others felt that more emphasis on population health, including disease prevention and health promotion was required.

Residents in the communities wanted to see longer physician stays of three to four years, so they could get to know the physicians and be known by them. They wanted surgery to be the last and not first option. They did not feel the system or the people in it were always culturally sensitive. They would like to have seen disease prevention and health promotion fostered (Wotton, 1993).

When the transfer of control of health services occurred in the Northwest Territories in 1988, Aboriginal people anticipated that their input into the control and provision of health services would be enhanced. They also expected that the emphasis on disease prevention, health promotion and personal responsibility would be increased and the acquisition of the local skills and knowledge in managing their own health services

delivery would be accelerated (Wotton, 1993).

While there have been notable achievements, the findings of a public enquiry into abortion services, the Auditor General's comprehensive audit of the Department of Health and the regional consultations of the Special Committee on Health and Social Services attest to the gap that exists between these expectations and reality. The current disparity between the medical services provided and health needs of the Region called for a re-orientation of physician services. Which physician services are provided and how they are provided needs to be arranged in such a way that it assists rather than hinders community participation in health services and strengthens the commitment to health promotion and disease prevention (Starsfield 1988; Starsfield et al 1988).

Hospital administrators reported that the lack of physician involvement in quality assurance committees threatened the accreditation of the hospital. In addition, Wotton noted that, in the town of Inuvik, physicians provided services which were routinely provided by community health nurses in the other communities. She wrote that the "use of nurse practitioners within the town of Inuvik would provide concrete evidence that, even when physicians are available, use of nurse practitioners can result in cost effective, high quality care to the satisfaction of the community" (Wotton, 1993, 9).

The Wotton Report recommended paying physicians by salary in order to meet the goals identified by regional residents, health administrators and care providers. Salary would encourage physicians to practice in the Region for longer periods of time through contractual arrangements. Second, salaries would remove financial incentives for physicians not to participate in non-billable activities such as hospital committees and health promotion initiatives. Third, salaried positions would also stabilize physician

supply and ensure regular community visits. Finally, salary payment would remove incentives for physicians to provide primary care which could be delivered by nurse practitioners and encourage physicians to refer patients to them, particularly in the town of Inuvik.

3.0 Chapter 3 - Literature Review

3.1 Fee For Service

Fee for service physicians are reimbursed for each unit of service or procedure according to a negotiated fee schedule (Gabel and Redisch, 1979). Fee for service provides physicians with financial incentives to provide billable services and disincentives to participate in non-billable services such as quality assurance and health promotion programmes (Wright, 1996). The payment system also discourages physicians from referring patients to cheaper sources of care such as nurse practitioners. In the Northwest Territories, nurse practitioners, called community health nurses, are the common source of primary care in most communities. A nurse practitioner is a "registered nurse who has additional training that includes primary health care... [and] has the skills to work with clients, physicians and other health professionals to assess, diagnose, and manage common illnesses" (Birenbaum, 1994, 7). It has become widely accepted that nurse practitioners can provide a wide range of primary health care services at least as effectively as and at lower costs than physicians (Pan et al., 1996).

Moreover, in the absence of budgetary controls, fee for service is an unpredictable health care cost and an open ended commitment to fund any level of physician activity (Birch et al., 1994). This is particularly true in the Northwest Territories where neither physician licensing nor billing restrictions are in place (Barer et al., 1995).

3.2 Salary

Salaried physicians are reimbursed for a specified period of time regardless of the

number of units of services provided or persons served (Gabel and Redisch, 1979). The payment method offers no financial incentives to provide additional services or work "harder". There are no financial disincentives for physicians to participate in non-billable activities or referring patients to other sources of care because incomes are guaranteed regardless of the number of clinical services personally provided.

The salary payment mechanism also allows for predictable physician remuneration costs. Administration, through the hiring function and through financial bonuses, can exert greater control over non-clinical aspects of practice styles.

3.3 Fee For Service versus Salary - Previous Findings

It has been claimed that "the way physicians are paid affects the services they provide" (Martin et al., 1980). The empirical evidence, however, is fragmentary and somewhat inconsistent. Some studies have contrasted the practice styles of physicians in health maintenance organizations (paid primarily on salary or under contract) with those in fee for service settings (Gaus et al., 1976; Luft, 1978; Hastings et al., 1973; Perkoff et al., 1976;, Scitovsky, 1981; Danzon et al., 1984; Manning et al., 1984; Epstein et al., 1986). With respect to diagnostic (radiographic and laboratory) testing, both Hastings et al. (1973) and Perkoff et al. (1976) found that more testing was done in pre-paid group practices. However, Epstein (1986) concluded that there were more tests when physicians are paid on a fee for service basis. Finally, others have found similar patterns of testing in fee for service and salaried settings (Scitovsky, 1981).

A number of studies have considered the effect that changes in the method of physician remuneration have on their patterns of practice (Martin et al., 1980; Schwartz

et al., 1981; Sims et al., 1984; Hammons et al., 1986; Berry et al., 1980; Moore et al., 1983; Childs and Hunter, 1982; Rice, 1983). When it comes to the relationship between the level of payment and the intensity of the practice some have found no relation (Martin et al., 1980; Schwartz et al., 1981; Moore et al., 1983), one a negative association (Rice, 1980) and in others a positive association (Sims et al., 1980; Hammons et al., 1983). When no relation was found, Martin (1980) and (Moore) 1983 suggested that the financial incentives were too small or that they (incentives) were keyed to collective rather than individual performance. None of these studies have, however, been able to determine if the specific effect of the method of physician payment caused the differences in practice style. The differences could be attributable to other factors such as the characteristics of patients and physicians, or organizational structure, group size or the availability of equipment.

3.4 Responses to Financial Incentives

In a study of physician responses to financial incentives Hemenway et al. (1990) concluded that substantial monetary incentives based on individual performance may induce a group of physicians to increase the intensity of their practice. The study appears to show that monetary awards led virtually all the physicians to increase the number of patient visits and the rate of diagnostic testing. In another study, Hieson et al. (1987) studied physicians in a single clinic that had been randomly assigned to receive either salary or fee for service reimbursement. The fee for service physicians scheduled more visits per patient and also saw their patients significantly more often than salaried physicians.

The fee for service method of payment allows practitioners to alter income by altering service volumes and/or billing patterns as well as through alterations in the fees themselves. The 1983 Report of the Federal Provincial Advisory Committee on Health Manpower stated the following: "On reviewing statistics on medical utilization in Canada (as measured by services provided by physicians under provincial medicare insurance plans) there were increases of per capita utilization of 3.3% per year from 1974/75 to 1982/83. Only about .5% could be explained by demographic changes" (Health and Welfare Canada, 1983, 131). A majority of the difference was attributed to changing practitioner practice and billing patterns as well as a substantial portion due to the increasing numbers and availability of physicians. Physician over supply and the fee for service method of payment each present a major challenge for those trying to rationalize the system and control costs (Sutherland, 1992).

3.5 Marginal Revenue and Demand for Physicians Services

According to Rice, demand inducement occurs when a physician recommends or provides services that differ from what the patients would choose if they were equally knowledgeable about medical care (1983).

George Monsma describes this phenomenon as Marginal Revenue and Demand for Physician Services theory. He bases his theory on the fact that the optimal treatment is often uncertain in medicine. Given that medicine is subject to uncertainty "the fact that he [the physician] will gain financially from a given treatment will, consciously or unconsciously, affect his judgement so that he will recommend this treatment more often than he would if he received no marginal revenue from it" (Monsma, 1966, 43).

Induced demand has been extensively researched, but is beyond the scope of this study. Previous studies have examined the relationship between physician supply and medical care, service intensity, income levels, fee levels, and physician versus patient initiated services; the relationship between changes in utilization and fee levels, methods of reimbursement, and medical knowledge; and small area variations in utilization (Labelle et al., 1993). However, the findings are contradictory and many other plausible explanations have been suggested for changes in utilization accompanying changes in financial incentives. Much of the controversy around supplier induced demand has been attributed to ideological differences rather than objective empirical evidence (ibid).

3.6 Summary

Although clinical factors largely govern physician decision-making regarding resource utilization, economic considerations, whether conscious or otherwise also exert pressure on the practice styles of physicians. There is no consensus as to the best means of remunerating physicians. In North America, critics of the fee for service system argue that physicians provide too many services. In Sweden and Britain, on the other hand, analysts have worried that doctors paid by salary, session, or capitation, do too little and/or refer too often (Bergstrom, 1992). As a result, system payers must balance the trade-off between over-utilization, under-utilization, value for dollar and other preferences in selecting and evaluating a payment system.

4.0 Chapter 4 - Methods

4.1 Permission to Conduct Study

Permission from both the Department of Health and Social Services and the Inuvik Regional Health Board has been obtained. The involvement and co-operation of both these organizations have been vital to the study. This study has ensured confidentiality by using scrambled patient and physician identification numbers. In addition, it has reported findings in the aggregate; neither physicians nor individuals have been identified.

4.2 Administrative Database

Data from the Northern Health Information Management System was obtained from the Department of Health and Social Services for the 1993/94 through 1995/96 fiscal years for the Inuvik Region (three full years of physician billing data for the fiscal year ending March 31). The Northern Health Information Management System is maintained in Yellowknife by the Department of Health and Social Services and consists of four individual databases: the Patient Registry, the Community Health Management Information System database, the Medicare database, and the Territorial Health Insurance Service database.

The Patient Registry contains unique identifiers, called Health Care Plan numbers, as well as common demographic information (such as name, birth date, sex, address, etc.). Application forms for registration with the Northwest Territories Health Care Plan are available in all communities but are processed in Inuvik, Iqaluit, Rankin Inlet, and Yellowknife only. The Patient Registry is generally reported to be fairly well maintained although it has not been formally audited for completeness, accuracy or reliability (Personal Communication, 1997, A. Sutherland, Inuvik Regional Health Board).

The Community Health Management Information System is a unique database consisting of clinical services provided by non-physicians (such as community health nurses) in the community health centres, health stations, and public health units. Rather than fee codes as in the Medicare data base, this data base records "P-codes" (Personal Communication, 1997, D. Macdonald, Department of Health and Social Services).

Data from neither the Patient Registry nor the Community Health Management Information System were used in this study. Rather, data from the remaining two databases of the Northern Health Information System were used.

The Medicare database contains physician billings for all physicians practicing in the Northwest Territories. Each physician is assigned a unique billing number. Service (fee) codes and diagnoses are recorded in ICD-9 codes. Billing forms for services provided at the Inuvik Regional Hospital or in community health centres and stations are

completed by the same billing clerks for both fee for service and salaried physicians. Billing forms for services provided at the private medical clinic is completed by clinic staff. The forms from the Inuvik Region are processed in Inuvik and Yellowknife by Territorial Health Insurance Service personnel. Although the Department of Health and Social Services reports "editing" the billings on a regular basis, a formal evaluation of the accuracy and reliability of the database has not yet been completed (Personal Communication, 1997, C. Carr and D. MacDonald, Department of Health and Social Services).

Health Care Plan numbers, physician billing numbers, primary diagnosis, service codes, and dates of service and billings were obtained from the database. All of these variables are required for payment, and hence the fields should be complete (Northwest Territories, 1995).

The Territorial Health Insurance Service Database is an exact replica of the Canadian Institute of Health Information submission prepared by Territorial hospitals. It contains information from all in-patient hospital discharges. It contains the same physician billing numbers as the Medicare database and ICD-9 codes are also used for services codes and diagnoses.

4.3 Data Preparation

4.3.1 Data Collection

Billing forms are completed and reviewed by health record technicians before submission. During the 1993 though 1996 fiscal years, information from the Inuvik Regional Hospital was processed in either Inuvik or Yellowknife by Territorial Health Insurance Services Staff (Personal Communication, 1997, C. Carr, Department of Health and Social Services; A. Sutherland, Inuvik Regional Health Board). Although there are occasional reviews of the reports sent to the Inuvik Regional Hospital from the Canadian Institute for Health Information, there has not been a formal evaluation of the database. Health Care Plan numbers, physician-billing numbers, primary diagnosis, service codes and dates of service and billings were obtained from the database.

4.3.2. Scrambling of Identification Numbers

The data tables contained scrambled doctor and patient identification numbers in order to protect the confidentiality of both the physician and the patient. Scrambling was done by the Department of Health and Social Services before the data were received by the investigator. The scrambling methodology consisted of assigning numbers sequentially to both patients and doctors within each payee ID category. The result was

that numbers were not unique. For example, patient number 1 appeared in each data table since the numbers were assigned within each of the payee ID categories. As a result of this method of identification number scrambling, it was not possible to identify whether a patient appeared in more than one payee ID category and it is not possible to merge data tables and continue using ID numbers as originally assigned. In order to merge data tables a unique patient and doctor identifier was created by assigning an ID number based upon the eight-character payee ID number followed by the sequential number assigned during the initial data extraction. Each record represents a single billing in respect to the particular patient on a particular day for a single visit or encounter.

4.3.3. Data Cleaning

The data were cleaned when received. All necessary data were present in the fields identified and the data was in apparently correct format. The data were linked to an ICD-9-CM descriptor file, which maps ICD-9-CM codes to 27 character narrative descriptions.

The data were sorted by physician number, patient number, date, and diagnostic code in the process of aggregating the data. Two billing accounts were provided: 1) fee submitted and 2) fee approved. The fee-approved amount was used throughout the analysis.

After obtaining the data, the Medical Director from the Inuvik Regional Health Board was asked to identify general practitioners and specialists as well as their payment type (fee for service or salary) using billing numbers and dates when services were provided. The specialists were then excluded from the data. The study therefore undertook to analyse the billing data of general practitioners.

The data for the general practitioners consisted of eight data tables based upon fiscal year, the payee ID number, for a total of 86,769 records of billings. The 1994 data consisted of two tables and had a total of 29,692 records. The 1995 data consisted of three tables and had a total of 29,466 records. The 1995-96 data also consisted of three tables and had a total of 27,611 records. The data were merged into a single table of 86,769 records.

4.3.4. Fee Adjustments

Fees were increased by 1.8% as of August 15, 1993 and decreased by 4.5% as of July 1, 1995. The dollar values of the billings were adjusted to reflect theses changes and are presented in April 1, 1993 Canadian dollars.

4.3.5 Preliminary Analysis for Sources of Error

A preliminary examination of the data set showed large differences in billing

practices raising some concern about data reliability. The data, as well as the preliminary analysis were provided to the Inuvik Regional Health Board for review. Dr. Chuck MacNeil, Medical Director at the Health Board reviewed the preliminary data and queried billing staff at both the Health Board and the Territorial Health Insurance Service about any problems with billings between 1993 and 1996. Neither billing discrepancies nor errors in the data were reported (Personal Communication, 1997, C. MacNeil, Inuvik Regional Health Board).

4.4 Data Analysis

The data were used to compare the two payment groups by the three-year period as a whole and by each fiscal year. Examining the two groups by the three year period helped to answer whether the practice patterns of the two groups differ; examining the two groups in each fiscal year determined first, whether the difference was consistent over the full period of time, and second, whether the groups changed their practice over time. The data were analysed for each payment group.

Four indicators were used to compare the practice patterns of the two groups: (a) service intensity - the number of claims, or services, submitted per patient encounter or visit, (b) billing intensity - the dollar value of services provided during each visit, (c) propensity to recall patients - the proportion of recall visits of total visits, and (d) billings

from recall - the proportion of billings from recall visits of total billings. In addition when the two groups are compared over the three-year period, the ten most common service categories were considered. This last indicator described whether similar services were being provided by the two groups of physicians.

4.4.1 Service Intensity Calculation

Mean service intensity by payment group was calculated by dividing the total number of services provided by each group within the fiscal year or the three year period by the total number of visits in each group. The unit of analysis was service/visit in each of the comparison

4.4.2 Billing Intensity Calculation

Mean billing intensity by payment group was calculated by dividing the total dollar value of the billings for each group within the fiscal year or the three-year period by the total number of visits in each group. The unit of analysis was dollars billed/visit in each of the comparisons.

4.4.3 Propensity for Recall Calculation

A recall visit is designated by a specific service code in the billing record. Mean propensity for recall visits by payment group was calculated by dividing the number of recall visits for each group within the fiscal year or the three year period by the total number of visits in each group. This figure was multiplied by 100 to produce a percentage. The unit of analysis was % recall visits/total visits.

4.4.4. Billings from Recall Calculation

Mean proportion of billings from recall visits of total billings was calculated by dividing the dollar value of billings from recall visits by the total dollar billings for each group within the fiscal year or the three-year period. This figure was multiplied by 100 to produce a percentage. The unit of analysis was % billings from recall visits/total billings.

4.4.5 Most Common Services

In each fiscal year, the ten most common ICD-9-CM narrative descriptions were generated from the data for each physician group.

4.6 Testing for Statistical Significance

The Mann-Whitney-Wilcoxen test was used to test for differences between the two groups for each of the indicators in each of the analysis. The Mann-Whitney-Wilcoxen test is a non-parametric test, similar to the t-test. A non-parametric test was selected because initial plotting of the data revealed that the data did not have a normal probability distribution, a requirement for parametric tests. Second, each physician contributed an unequal proportion of total services (a few physicians in some cases generated the bulk of a groups data), the data may not have been independent. Differences between the two groups were tested at 95% confidence (probability of 0.05).

5.0 Chapter 5 – Results

5.1 Physicians

During the three years of this study a total of 63 general practitioners worked in the Inuvik Region for varying periods of time. Of that total, 28 were paid fee for service and 35 were paid on a fixed salary. Table 1 summarizes the number of physicians in each group in each year of the study.

Table 1. The Number of General Practitioners in the Inuvik Region, 1993-1996.

	Year		
Physician Group	1993/94	1994/95	1995/96
Fee For Service	20	13	8
Salary	5	15	17
Total	25	28	25

The table shows that the number of fee for service physicians decreased steadily during the study while the number of salaried physicians increased as they were hired incrementally. Although there was only one fee for service physician who practiced throughout the entire three years of the study, there were three other fee for service physicians who were there for most of the period. The first salaried physician was hired in November 1993. In the last two years of the study roughly five physicians had long term contracts (for one year or more), the others were there for shorter periods of time. At any given time there was a total complement of roughly seven physicians in the region.

Table 2 summarizes the number of full time equivalents in months worked by physicians in each group in each year of the study. The total full time

equivalent in months worked is relatively consistent for each of the three years of the study. The table shows a decrease of fee for service full time equivalent months worked of over fifty percent when comparing year one with year three. Correspondingly, the salaried full time equivalent months worked increased dramatically over the three years.

Table 2: Monthly Full Time Equivalents of Fee for Service and Salaried Physicians in the Inuvik Region, 1993-1996.

	Year		
Physician Group	1993/94	1994/95	1995/96
Fee For Service	96	66	47
Salary	10	49	62
Total	106	115	109

5.2 Analysis of Aggregate Practice Patterns

In order to analyze the billing patterns of these physicians a number of constraints had to be taken into consideration. First, there was no record of the hours worked per day, per week or month for individual physicians. There was also no record of whether a physician worked for any one full month or only a portion thereof. Third, there was no control over case mix of patients seen, and finally, many of the physicians worked for only a portion of the study and in many cases for only a portion of any one year. As a result of these limitations, much of the data had to be analyzed in the aggregate. In other words, a monthly analysis of billings, patient visits, recalls and dollars billed was of little value. The data was analyzed in total (for the three year period) and from year to year by comparing one group to the other (fee for service versus salaried).

Table 3 summarizes the activity for each of the payment groups by

number of claims submitted (services provided), the total billings and the number of patient visits in each year of the study.

Table 3: Practice Patterns of Fee For Service and Salaried Physicians in the Inuvik Region, 1993-1996.

	Fee For Service	Salary	Total
Claims (number)			
1993/94	29 022	670	29 692
1994/95	22 570	6 896	29 466
1995/96	18 007	9 604	27 611
1993/94 – 1995/96	69 599	17 170	86 769
Billings ($1993)			
1993/94	1 270 587	21 981	1 292 568
1994/95	1 034 418	218 525	1 252 943
1995/96	807 844	386 180	1 194 024
1993/94 – 1995/96	3 112 849	626 686	3 739 535
Visits (number)			
1993/94	23 642	610	24 252
1994/95	17 040	5 745	22 785
1995/96	13 993	8 565	22 558
1993/94 – 1995/96	54 675	14 920	69 595

5.2.1 Claims Submitted.

A three year comparison shows a steady decrease in the number of claims submitted by the fee for service physicians. On the other hand, claims submitted by the salaried physicians increased over the same time to 34.7 percent of the total yearly claims. Overall, the total number of claims for the two groups decreased over the three year period from 29,692 to 27,611, a decrease of seven percent.

5.2.2 Billings.

Billings submitted by the fee for service physicians decreased over the three year period from a high of 98.3 percent to 68 percent of the total billings.

The proportion of billings by salaried physicians increased from a low of 1.5 percent in 1993/94 to 32 percent in 1995/96. Overall, there was a decrease of $98,844 in total billings of the two groups, representing a decrease of 7.6 percent.

5.2.3 Patient Visits.

The number of patient encounters performed by the fee for service physicians decreased over the three year period from 97.5 percent to 62 percent, whereas the number of patient visits for salaried physicians increased from two percent to 38 percent of the total. There was an overall decrease of 1,694 patient encounters for the two groups, representing a decrease of 7.0 percent.

5.2.4 Summary of Aggregate Practice Patterns.

Despite the lower number of fee for service physicians and full time equivalents in months worked in 1995/96, they continue to account for a greater proportion of visits claims and billings. However, during the three year period, as salaried doctors assumed a greater portion of the work load total billings, claims and visits all showed a total net decrease in the seven to eight percent range. The data showed that salaried physicians performed 21.43 percent of the visits but only generated 19.78 percent of the claims (number). Moreover, while salaried physicians performed 21.43 percent of the visits, the billing dollars amounted to only 16.75 percent of the total dollars billed for both groups.

5.3 Comparison of Practice Indicators

Table 4 summarizes the mean rates of the two groups for service intensity (the number of claims submitted per visit), billing intensity (the dollar value of fees claimed per visit), propensity for recall (the number of visits classified as recall as a percentage of total visits) and recall billings (the dollar value of recall visits as a percentage of total dollars billed).

Table 4: Practice Indicators of Fee For Service and Salaried Physicians in the Inuvik Region, 1993 – 1996.

	Fee For Service	Salary	Z score	ρ value
Service Intensity (claims/visit)				
1993/94	1.23	1.09	-3.02	0.003
1994/95	1.33	1.26	-2.88	0.004
1995/96	1.29	1.12	-3.33	0.001
1993/94 – 1995/96	1.28	1.15	-5.16	0.000
Billing Intensity ($/visit)				
1993/94	53.72	36.03	-3.16	0.002
1994/95	64.14	38.00	-4.16	0.000
1995/96	59.37	45.09	-2.94	0.003
1993/94 – 1995/96	59.08	42.00	-5.90	0.000
Propensity for Recall (%)				
1993/94	30.85	6.82	-3.16	0.002
1994/95	34.86	14.71	-3.93	0.000
1995/96	34.94	17.36	-4.16	0.000
1993/94 – 1995/96	33.55	14.54	-6.74	0.000
Recall Billing (%)				
1993/94	36.37	7.12	-3.16	0.002
1994/95	38.95	16.35	-4.04	0.000
1995/96	37.42	23.20	-3.90	0.000
1993/94 – 1995/96	37.58	17.78	-6.52	0.000

5.3.1 Service Intensity.

The mean number of claims submitted by fee for service physicians was

consistently higher than for salaried physicians in each year. The Z scores of each year exceed -1.96 at a confidence level of 0.05 indicating a statistically significant difference between the two groups. Although service intensity generally increased for both groups over the three year period, fee for service physicians clearly submitted more claims per visit than the salaried physicians.

5.3.2 Billing Intensity.

Here again, both groups generally had increases over the three year study, although the salaried physicians showed a much more dramatic increase in the mean dollars billed per visit. The mean billing difference between the two groups narrowed from $17.69 in 1993 to $14.28 in 1995. The difference between the two groups were statistically significant in each year and over the three year period, with all Z score values exceeding -1.96 at a confidence level of 0.05. The fee for service physicians clearly generate higher fees per visit than the salaried physicians.

5.3.3 Propensity for Recall.

For this study, patient recall is defined as a patient revisit to a physician within thirty days of the initial encounter. The revisit could be either physician or patient induced. Thirty days was decided upon after discussions with a number of physicians familiar with practice in the Inuvik Region. Most recalls occur within a two to three week period after the initial encounter, however most physicians interviewed felt that a month cut off would capture substantially all potential

recalls.

Fee for service physicians consistently derived a higher percentage of their fees from recalls than salaried physicians. Although the difference between the two groups narrowed over the three year period the Z scores clearly indicate a statistically significant difference between the two groups. All scores exceed -1.96 at a confidence level of 0.05. The fee for service group saw significantly more recall visits as a percentage of total visits than the salaried group.

5.3.4 Billings from Recall.

Given the results of the previous analysis where the fee for service group had significantly higher recall rates as well as significantly higher fees it stands to reason that there would be a significant difference in the mean value of fees obtained through recall visits. This was, in fact, borne out in the analysis.

The mean value of fees obtained through recall visits as a percentage of total visits billed was 37.58 percent for the fee for service group compared to 17.78 percent for the salaried group. Fees obtained from recall visits from salaried physicians is less than 50 percent of the fees obtained through recalls by fee for service physicians. This striking difference is confirmed with a Z score of -6.52, again significantly exceeding -1.96 at a confidence interval of 0.05. Therefore there is a statistically significant difference in the means of the two physician populations. The rate at which fee for service physicians obtained their fees through recall visits is more than double that of salaried physicians.

5.3.5 Summary of Practice Indicators.

The results of Table 4 show that there are statistically significant differences in the billing patterns of fee for service physicians compared to salaried physicians in the Inuvik Region. For each year of the study all four measures service intensity, billing intensity, propensity for recall and recall billing were significantly higher for the fee for service group.

5.4 Changes in Practice Patterns Over Time

Table 5 compares the billing pattern indicators of the two groups in the first and third years of the study in order to determine if there were statistically significant changes over time.

Table 5: Practice Indicators of Fee For Service and Salaried Physicians in the Inuvik Region in 1993/94 and 1995/96.

	1993/94	1995/96	z score	ρ value
Fee For Service				
Service Intensity (claims/visit)	1.23	1.29	-2.51	0.012
Billing Intensity ($/visit)	53.72	59.37	-2.14	0.033
Propensity for Recall (%)	30.85	34.94	-2.14	0.033
Billings from Recall (%)	36.37	37.42	-0.95	0.347
Salary				
Service Intensity (claims/visit)	1.09	1.12	-1.49	0.137
Billing Intensity ($/visit)	36.03	45.09	-3.16	0.002
Propensity for Recall (%)	6.82	17.36	-3.16	0.002
Billings from Recall (%)	7.12	23.20	-3.16	0.002

5.4.1 Service Intensity.

The service intensity for both groups increased over the course of the

study. However, only the increase in service intensity for the fee for service group was statistically significant having a Z score of -2.51 and being higher than -1.96 at a confidence interval of 0.05. The Z score for the salary group was –1.49 and therefore not statistically significant.

5.4.2. Billing Intensity.

The billing intensity of both groups increased over the three year period. The fee for service group had increases of $5.65 per visit, representing an increase of 10.5 percent. The salaried group had increases of $9.06 per visit, representing an increase of 25.14 percent. Increases for both groups were statistically significant with Z scores higher than -1.96 at a confidence interval of 0.05.

5.4.3 Propensity for Recall.

Increases in the propensity for recall were seen in both groups. Further, the increases were both statistically significant with Z scores being higher than -1.96 at a confidence interval of 0.05. The most dramatic increase occurred for the salaried group with 154.5 percent increase. In spite of this the propensity for recall was only half that of the fee for service group in the last year of the study.

5.4.4 Billings from Recall.

The billings generated from recall visits increased only slightly for the fee for service group and the change was not statistically significant. On the other hand there was a dramatic increase in this category for the salaried group. The percentage of billings generated through recall visits increased from 7.12 percent

to 17.18 percent.

5.4.5 Summary of Changes in Practice Patterns Over Time.

The behaviour of both groups changed over the three year period. For the fee for service group the changes occurred in each indicator except billings from recall and for the salaried group significant changes occurred in all indicators except service intensity.

5.5 Comparison of Most Commonly Provided Services

Tables 6 and 7 highlight the top ten diagnostic codes submitted by the fee for service and salaried groups respectively for each year of the study.

Table 6: Most Common Services Provided by Fee For Service Physicians in the Inuvik Region 1993/94 – 1995/96.

Service Code Group	1993/94 no. (rank)	1994/95 no. (rank)	1995/96 no. (rank)
Supervision on normal pregnancy	1698 (1)	1517 (1)	433 (7)
Acute upper respiratory infection	693 (2)	736 (2)	449 (6)
Otitis media	636 (3)	736 (2)	598 (3)
Counseling	517 (4)	*	*
Follow-up exam – unspecified	499 (5)	736 (2)	812 (2)
Acute tonsillitis	333 (6)	*	*
Abdominal pain	328 (7)	*	*
Mental retardation	322 (8)	418 (6)	390 (8)
General medical exam	310 (9)	*	*
Hypertension	300 (10)	*	*
Screening mal neoplasm cervix	*	610 (3)	*
Observation of suspect condition	*	534 (4)	*
Supervision on first pregnancy	*	406 (7)	*
Normal delivery	*	401 (8)	*
Bronchitis	*	392 (9)	290 (9)
Laboratory examination	*	*	1544 (1)
Reason for consult not specified	*	*	530 (4)
Injury	*	*	510 (5)
General symptoms	*	*	285 (10)

* not among ten most common service codes during year

Table 7: Most Common Services Provided by Salaried Physicians in the Inuvik Region 1993/94 – 1995/96.

Service Code Group	1993/94 no. (rank)	1994/95 no. (rank)	1995/96 no. (rank)
Chronic airway obstruction	5 (1)	75 (10)	107 (9)
Hypertension	4 (2)	184 (3)	141 (5)
Supervision other normal pregnancy	3 (3)	399 (1)	564 (1)
Haematuria	3 (3)	*	*
Dermatitis	3 (3)	78 (9)	135 (7)
Contraceptive management	2 (4)	*	*
Otitis media	2 (4)	114 (5)	281 (3)
Lumbago	2 (4)	*	*
Ingrown nail	2 (4)	*	*
Anxiety state	2 (4)	*	*
Follow-up exam	*	269 (2)	389 (2)
Abdominal pain	*	116 (4)	*
Acute upper respiratory infection	*	90 (6)	207 (4)
Administrative encounter	*	85 (7)	*
Backache	*	81 (8)	*
Special examination	*	*	138 (6)
Acute tonsillitis	*	*	117 (8)
Urinary tract infection	*	*	106 (10)

* not among ten most common service codes during year

The data from the salaried physicians is obviously affected by the small volume of service provided by this group of physicians in the first year. The values seem unstable.

For the fee for service physicians, these data suggest that standard practices have changed considerably over the three years. The most common service in 1995/96 was not present in the lists of the two preceding years. As there was very little change to the list of billable codes, it is quite suspicious that 1,544 billable services were provided in the third year while hardly being billed in the previous two years.

Comparing the two groups, only four codes were similar (i.e. in the top ten for each group): follow-up exams, supervision of normal pregnancy, otitis media and urinary tract infection.

Although the results are somewhat inconclusive the two tables revealed a high degree of variation in the diagnoses submitted by the two groups. Further, there was also substantial variation within each group from one year to the next, particularly for the fee for service group.

5.6 Summary

Using the Mann-Whitney-Wilcox test, this study found statistically significant differences between the billing patterns of fee for service and salaried physicians in each of the four measures examined. Further, the study has shown that in most cases, the fee for service group had significantly higher claims per patient visit, billed more for each claim submitted and obtained a greater proportion of their total billings from recall visits. Finally, the study found that the services provided by one group differ from those provided by the other. Among the fee for service groups, there was a considerable change in the diagnostic code submitted.

6.0 Chapter 6 - Discussion

6.1 The Salary Programme

In 1993, the Inuvik Regional Health Board began a pilot project remunerating general physicians by salary. The programme had three objectives: (a) to increase the period of practice of general practitioners in the Region, (b) to increase physician involvement in non-billable activities such as quality assurance programmes; committee work; and health promotion, prevention, and education efforts, and (c) to reduce physician service costs. Since 1993, the number of salary physicians in the Inuvik Region has steadily increased while the number of fee for service physicians has decreased, all the while retaining a relatively stable number of physicians and full time equivalents (Table 1 and Table 2). In the first year of the programme, however, there were very few salary physicians and comparisons with the fee for service physicians may not provide an accurate reflection of differences in the practice habits of the two groups. Data from the two latter years of study likely provides a better picture of the differences between the two groups of physicians.

6.2 Fee For Service Physicians

The analysis of the administrative data revealed that, despite their increasingly smaller numbers, fee for service physicians continued to account for a greater number and proportion of total visits, claims, and billings than salary physicians. It is evident that the practice patterns of fee for service physicians were significantly different from those of salary physicians. As shown in Table 3, fee for service physicians have consistently

provided more services per patient visit, provided more visits, and recalled patients more frequently than their counterparts, resulting in more billable services.

One possible explanation of this difference is that fee for service physicians may have worked longer hours and worked "harder" (that is, at a greater intensity) than salary physicians. The incentives inherent in fee for service remuneration certainly support this hypothesis. However, the magnitude of the difference in the practice indicators between the two groups of physicians, the changes in the fee for service practice over the three year period, as well as reductions in the fee for service patient population suggest that this explanation alone does not account for the difference in practice patterns. In the final year of the study, when salary physicians outnumbered fee for service physicians, and when the salary programme was well established, fee for service physicians provided nearly twice as many services per visit and billings per visit and had a recall rate nearly twice as high. Moreover, during the three-year period, fee for service physicians increased the number of services they provided during each visit, billings per visit, and recall rate. There was also a dramatic change in the types of services for which they billed. In the last year of the study, the most commonly billed service category was laboratory examination. This change in billing occurred even though there was no change in the fee schedule (Personal Communication, 1998, D.Campbell, Territorial Health Insurance Service). Finally, in June 1995, the fee for service physician stationed in Norman Wells who had provided service to the five southern communities left the Region. For the remaining ten months of the 1995/1996 fiscal year, the patient population for whom fee for service physicians provided general practice services came from the town of Inuvik. Salary physicians also served the residents of Inuvik. During

the period of this study, the population of the town of Inuvik had decreased, from approximately 3600 in 1993 to roughly 3200 in 1996 (Mathews, 1996).

Although not demonstrated in this study another possible explanation is that fee for service physicians engaged in fee splitting or cross referrals more than salaried physicians. Fee for service physicians may also have been inclined to opt for a higher fee if and when possible.

Despite their decreasing numbers and the reduction in patient population, fee for service practitioners continued to increase their service and billing intensity and increase their propensity for recall. The evidence suggests that in addition to possibly working more hours each day and working "harder" each hour, fee for service physicians sustained or elevated revenue levels by providing additional services (or providing services previously performed by nurses or laboratory technicians), aggressively billing, and recalling patients more often.

6.3 Salary Physicians

Salary physicians consistently provided fewer services per visits than fee for service physicians. Their service intensity did not change significantly over the three year period. However, their billing intensity and recall rate, although less than that of fee for service physicians increased over the three year period.

Although salary physicians provide fewer services than fee for service physicians, this does not indicate that the patients of salary physicians were not receiving required services. Rather salary physicians likely referred services to nurse practitioners, particularly follow-up and laboratory related procedures. Because salary physicians do

not face financial disincentives for referring their patients to other health care providers, they are more likely than fee for service counterparts to use these available resources. Moreover, because salary physicians provide service to the outlying communities, follow-up visits as well as minor procedures were likely performed by community health or public health nurses after the physicians have left the community. This hypothesis could be readily tested in future studies by linking both the two data bases used in this study with the Community Health Information System data base.

The referral of services to nurse practitioners represents a more efficient use of resources. Because the community health nurses are available in the communities and are the only source of medical care for most of the time, they represent fixed costs to the Inuvik Regional Health Board. Except for slight modifications in staffing ratios, the Health Board must maintain these positions. Moreover, because nurses have lower salaries than physicians, they represent a more efficient use of resources for those services which can be provided by nurses (or other health professionals). The use of nursing personnel in this way also reduces physician workload and increases the time available to physicians to participate in non-billable activities.

The change in practice behaviours between 1993 and 1996 of salary physicians may have resulted from a number of causes. In the first year of the study, the salary programme was still in its "infancy stage. There were only a few salary physicians who provided very few services. Much of the difference shown in Table 5 (154% increase in propensity for recall), likely stems from "growing pains". By the third year, the number of practicing salary physicians had grown and the programme had become well established. Continued monitoring of salary physicians and comparison with the fee for

service physicians will provide a better indication of the service levels provided by salary physicians.

Alternatively, it is possible that salary physicians increased their service levels (and hence their billings) as a justification strategy for the Inuvik Regional Health Board. Because the billings submitted by the Health Board on behalf of the salary physicians were monitored by the Department of health and Social Services, these service levels served to justify the physicians' salary levels. Again, further evaluation of the claims submitted by salary physicians may provide a better picture of billing practices.

6.4 Factors Influencing Practice Behaviours

The factors which influence practice behaviours extend well beyond payment method alone. These factors can be grouped into two categories: (a) structural or organizational factors, and (b) individual factors.

Structural factors define the environment or context in which physicians practice. These factors vary from one region to another as well as between institutions. Some of these factors can be influenced by the individual whereas others may be dictated by organizational rules, regulations, protocols or practice guidelines. Common structural factors are groups versus solo practice, peer review of prescribing and treatment habits, referral rates to specialists, specialist availability, geographical location (rural versus urban nature of the practice), the utilization of diagnostic services, emergency department admission rates, and the use on non-physician providers as part of the care team (Eisenberg, 1984). In addition, they can include the provider selection process, community involvement in the organization and delivery of health services, the emphasis

on health promotion and prevention services, accountability, quality of care, quality improvement programs and demographics of the practice population (Eisenberg, 1984).

Individual factors are those that define physicians personally and include work ethic, value placed on income, susceptibility to peer pressure, socialization processes, cultural background, quality of medical practice and quality of family life.

Salary physicians are likely to have different individual factors than fee for service physicians. These factors may account for a portion of the differences seen in practice behaviour. Moreover, when the Inuvik Regional Health Board hired the salary physicians, they selected individuals whose personal philosophy and practice preferences most closely aligned or complimented the salary programme and the goals of the health care system. Salary physicians relinquish some of their autonomy and independence by assuming an employee position with the health board. Moreover, many of the structural factors will be determined by the employer who controls much of the physicians' work environment. This demonstrated in this study through geographical factors. In this case only salaried physicians were allowed to practice in communities outside of Inuvik.

Fee for service physicians, on the other hand, control much of their own structural factors - they can control the number of hours they work per week how and when appointments are scheduled, how diagnostic tests are done, as well as how often patients are seen. They can also control, to some extent, the types of patients who they see.

6.5 Implications for the Organization of Physician Services

Fee for service is both a funding and a payment modality. In such a system, the medical budget is allocated among providers based on the volume and type of services

provided. It is the predominant method of physician payment in Canada today, even though it is widely recognized as providing the wrong signals to physicians (i.e. the more service one provides the more income one receives irrespective of who receives the services and the expected effect of the service on the patients' health). Repeatedly, commission and task force reports identify fee for service as incompatible with promoting the most productive use of the time and skills of physicians. Until recently, the fee for service system provided an open-ended commitment to fund any level of physician activity and any population distribution of that activity.

The additional disadvantages of fee for service are that it does not promote either continuous or comprehensive care and creates few incentives for physicians to deliver care efficiently or encourage physicians to practice in areas of need. Many countries, including Canada and the United Sates, are experiencing a confusing dichotomy of service over utilization in certain areas and populations and severe access/shortage problems in others. One question which remains is whether a given system can produce incentives to increase the demand for physician substitutes such as advanced clinical nurses. Further there is little evidence that an adequate supply of physicians results in better health.

Moving to alternative payment forms such as salary, contract or capitation reimbursement is a market based economic strategy aimed at changing incentives within the system. For example, the impetus to reduce postgraduate training positions in the United Sates is driven by the same impetus which drives changes in Canada. A perceived surplus of doctors and a conviction that such an over supply leads to unnecessary tests, procedures, hospitalization and visits which increase health care costs.

The ethic of doing everything possible for the patients can be interpreted as either more comprehensive care or generation of utilization to maintain income (Evans, 1984). Whatever the practitioner's motivation, the outcome is generally the same - widely divergent and expensive results.

In the Inuvik Region this study demonstrates that the practice patterns of fee for service and salary physicians are different. The evidence suggests that hiring physicians and thereby creating incentives to refer procedures to other health professionals and spending more time on non-billable activities is a more efficient means of providing physician services. Although continuation of the programme will result in reduced billings, additional funds are required for ongoing recruitment, physician training, and programme administration.

6.6 Limitations

This was the first study to use the Northern Health Information System. Although the databases used in the project are similar to those used in other Canadian studies. The reliability and accuracy of the database has not yet been established. Although the Territorial Health Insurance Service reports conducting regular audits of the physician data base and the Canadian Institute for Health Information sends reports to the Inuvik Regional Health Board, chart abstractions are needed to assess potential sources of error in these records.

Second, as more studies are conducted with these databases, more sophisticated scrambling methodologies (of personal identifiers) should also emerge from the Department of Health and Social Services. These methods will allow for linkages

between individual patient records both within a database as well as across the four data bases and other sources of information. These linkage strategies are instrumental for more in-depth studies and sophisticated analytical methods. For example, linkage between patient records will allow future researchers to examine patient outcomes, control for severity of illness, and create episodes of illness.

Many important outcome indicators were beyond the scope of this project. For example, the study did not investigate the quality of care delivered by the two physician groups, or the impact of service on patient health status. Although the study showed that fee for service physicians provided more services than salary physicians, further research may determine whether these services were necessary or appropriate. Finally, the study did not evaluate the total costs (both direct and indirect) of the two methods of physician remuneration.

This study also suggests that whereas the fee for service physicians may provide many services directly, that salary physicians provide "physician" services in partnership with health professionals. However this has not been conclusively demonstrated. Future studies should not simply consider the services and associated costs of physicians alone but should study the two models of service delivery.

Finally, this study was not a comprehensive evaluation of the pilot project. It has considered only the third of the three project objectives. Further study is required to determine the programme's success in involving physicians in non-billable activities and in lengthening the period of practice in the Region. Moreover, this study was from the perspective of the Inuvik Regional Health Board and the Department of Health and Social Services. Future evaluations should also examine the patients', physicians' and

other staff's perspectives before reaching final conclusions about the impact of the pilot project.

Despite of these limitations, this study has laid the groundwork for a number of future studies. It was the first step in developing an understanding of physician payment mechanisms in remote regions. It was also the first project to use the Northern Health Information system which is a rich resource for studying physician services in the Northwest Territories as well as the health of Northern residents.

7.0 Chapter 7 - Conclusions

7.1 The Current State of Physician Payment

Currently only about 15 % of Canadian physicians are reimbursed on a salary basis. In the United States, approximately 50 % of physicians are paid salary, primarily as a result of the evolution of Health Maintenance Organizations. Numerous studies point to the benefits of this method of remuneration. The benefits are predominantly lower resource utilization, thus lower costs overall and better continuity of care. There is little evidence to suggest that open-ended fee for service results in more appropriate levels of care or improved client or patient satisfaction.

North American physicians have, for the most part, done well financially through the fee for service system. However, have their benefits come at the expense of taxpayers and the quality of care? When all other means of health care rationing through health reform have been explored, it makes only good sense to seriously consider how physician services are funded. Physicians act as the gate-keepers to the health care system and drive the health care system. If the method of remuneration does not have the appropriate incentives or disincentives, then the system as a whole will suffer.

Many of the younger medical school graduates are not adverse to a new system of remuneration. Over 50% of medical graduates are female. Many of the younger physicians have a different mind-set or value system as opposed to the workaholic mind-set of many older male physicians. What seems to be valued most by the current generation of graduating physicians is: (a) a stable and fair method of remuneration, (b) a life style that is conducive to family life, and (c) a medical practice that is challenging and which allows them to use the skills acquired in medical school as opposed to acting

as glorified nurse practitioners.

7.2 Summary of Study Findings

This study examined the practice patterns of salaried and fee for service general practitioners in the Inuvik Region of the Northwest Territories. The chief objective of the study was to determine if, in the Inuvik Region, the practice patterns of fee for service and salaried physicians differ.

The study used administrative records from the Northern Health Information Management System for the 1993/94 through 1995/96 fiscal years for the Inuvik Region. The data contained all billings and in-patient hospital discharges for general practitioners in the Inuvik Region. The Department of Health and Social Services scrambled physician and patients identification numbers in order to protect the confidentiality of both the physicians and patients. Because of the scrambling method, it was not possible to identify whether a patient appeared in more than one payee ID category and it is not possible to merge data tables and continue using ID numbers as originally assigned. As a result, the analysis was limited to aggregate comparisons between the two groups as a whole and between mean physician practice indicators.

The data were used to compare the two payment groups by the three year period as a whole and by each fiscal year. Four indicators were used to compare the practice patterns of the two groups: (a) service intensity, (b) billing intensity, (c) propensity to recall patients, and (d) billings from recall. In addition, the ten most common service categories in each year were examined for each physician groups.

Throughout the three year period, fee for service physicians accounted for a

greater number and proportion of total visits, claims, and billings than salary physicians. The practice patterns of fee for service physicians were significantly different from those of salary physicians. They provided more services per patient visits, provided more visits, and recalled patients more frequently than their counterparts. These findings suggest that in addition to possibly working more hours each day and working "harder" each hour, fee for service physicians sustained or elevated revenue levels by providing additional services (or providing services previously performed by nurses or laboratory technicians), aggressively billing, and recalling patients more often. This finding suggests that although the primary influence on utilization levels and patterns of practice is the physicians' perception of patient health status (agency/patient relationship) and the potential benefits from available diagnostic therapeutic and other treatments. However, economic considerations, conscious or other wise, can exert an effect on preferred practice patterns and on the advice given to patients.

Salary physicians provide fewer services than fee for service physicians, likely because they referred more services to other health professionals (although not conclusively demonstrated). These referrals may have included those to nurse practitioners, particularly for follow-up and to registered laboratory technologists for laboratory related procedures. Because the data considered was collected when the salary programme had just begun, there were many changes in the practice patterns of the salary physicians over the course of the three year period. It was not possible to conclude whether these changes resulted from differences in individuals practice styles, "growing pains" of the programme, or external pressure from the Inuvik Regional Health Board to substantiate the alternative payment system.

The model of practice used by the salary physicians, where medical services are provided in partnership with physicians and other health professionals (primarily nurses) represents a more efficient service delivery model from the perspective of the Department of Health and Social Services and the Inuvik Regional Health Board. Continuation of the programme will likely attribute to the Department's global objective of reducing health care costs. Although continuation of the programme will result in reduced billings, additional funds are required for ongoing recruitment, physician training, and programme administration.

7.3 Recommendations

This study has not clearly demonstrated that salary is a more cost-effective method of physician reimbursement than fee for service. However, the indicators of claims per visit, volume of services provided, and recall visits all point to the very distinct likelihood that a new method of reimbursement may result in lower costs to the health system overall.

Given this possibility, it is recommended that the Inuvik Regional Health Board continue with the current pilot project. More detailed and systematic monitoring and study are required in order to make a final determination regarding the success of the project. This will require extensive study of a number of areas.

First, the question of diagnostic categories and episodes of illness will have to be more thoroughly researched. The findings of this study's diagnoses raised a number of questions. The variation of the groups from one year to the next was great and raised more questions than answers.

Secondly, it has only been hypothesized that salaried doctors referred or deferred to the use of nurse practitioners more than fee for service physicians. Better linkages with the Community Health Information Management System is required in order to determine if, in fact, there is a greater propensity for salaried physicians to utilize the service of nurse practitioners.

It is imperative that other databases be linked with those detailing physician services in order to study and determine which group, fee for service, or salaried, is able to effect more positive patient outcomes. Although extremely difficult to determine, some simple parameters can be identified to generalize a more global perspective.

Fourth, in order to conclusively determine if, in fact, salary is a preferred method of remuneration to that of fee for service, a detailed chart review must be undertaken to assess the quality of care provided. The chart review would involve linking diagnoses and patient outcomes with the intensity of services.

Finally, this study has not attempted to measure patient satisfaction. A survey could be easily conducted to determine to what degree both groups were able to satisfy patients' expectations. The study could consider issues such as access, time spent with patients, as well as outcomes.

The Department of Health and Social Services should consider dedicating more resources to the salary programme and develop other incentives to encourage programme enrollment.

This study has examined the practice pattern of only general practitioners. A number of specialists in the Northwest Territories have been on salary for the past five years. A retrospective study, similar in design to this one could be undertaken to

examine the practice pattern of specialists over the past ten years. If the results are similar to those of this study, they would provide more conclusive evidence that salary remuneration may be more cost-effective and provide more appropriate incentives for quality care.

This study has not measured the non-billable activities of the two groups of physicians. Indications are however, that salaried physicians were more amenable to spending more time on committees (i.e. the medical advisory committee, the mortality and morbidity committee, the utilization committee etc.), as well as more time on continuing medical education for other care givers (primarily nursing staff) (Personal Communication, 1997, Dr. C. MacNeil, Inuvik Regional Health Board).

8.0 References

Barer, M.L., Evans, R.G. and Labelle, R. (1988). Fee Controls and Cost Control: Tales from the Frozen North. The Millibank Quarterly Memorial Fund. (1) 1-4.

Barer, M.L., Samaritan, C., and Lomas, J. (1995). "Physician Expenditure Controls in Canada: Reminding our P's and Q's." McMaster University Centre for Health Economics and Policy Analysis Working Paper Series No. 95-11, and Health Policy Research Unit Discussion paper Series HPRU 95:7D, University of British Columbia.

Barnum, H., Kutzin, J. and Saxenian, H. (1995). Incentives and provider Payment Methods. International Journal of Health Planning and Management. 10, 23-45.

Beaufort Environmental Assessment Review Panel (BEARP), Transcript of Proceedings, 1983, Public Meetings, Inuvik, NWT, November, Vol.2

Berger T, Northern Frontier, Northern Homeland, the Report of the MacKenzie Valley Pipeline Inquiry: 1979, I, 143-162.

Bergstrom, H., "Pressures Behind the Swedish Health Reforms", Swedish Information Service, No. 12, July 1992.

Birch, S. Goldsmith, L. and Makela, M. (1994). "Paying the Piper and Calling the Tune: Principles and Prospects for Reforming Physician Payment Methods in Canada", McMaster University Centre for Health Economics and Policy Analysis Working Paper 9-1.

Birenbaum, R. (1994). "Nurse Practitioners and Physicians: Competition or Collaboration?" CMAJ 151(1); 7-78.

Callis, J.G. and P.A. West. The Economics of Health: An Introduction. New York: University Press, 1979.

Canadian Journal of Community Mental Health, Spec. Suppl. 1, 1983.

Cross Cultural Perspectives of Health and Mental Health, 2988m, NWT Mental Health Association and NWT Nursing Association.

Department of Health and Social Services. (1995). Health and Social Services Business Plan 1996/97 to 1998/99. Yellowknife: Department of Health and Social Services.

Eisenberg, J.M. (1985). Physician Utilization, The State of Research about Physician Practice Patterns. Medical Care, 1985, 23 (2) 4 1-483.

Epstein, A.M., and Blumenthal, D. (1993). Physician payment reform: past and future. Millbank Quarterly 71: 193-215.

Evans, G.G. (1984). Strained Mercy. The Economics of Health Care. Toronto: Butterworths.

Forrest, C.B. and Starfield, B. (1995). The Effect of First-Contact Care with Primary Care Clinicians on Ambulatory Health Care Expenditures. The Journal of Family Practice. 43 (1) 40-48.

Gabel, J.R. and Redisch, M.A. (1979) Alternative Physician Payment Methods: Incentives, Efficiency, and National Health Insurance. Millibank Memorial Fund Quarterly. 57(1) 38-59.

Hemenway, D., et al. 1990. Physicians' responses to financial incentives. New England Journal of Medicine 322: 1059-1063.

Hillman, A.L., Pauly, M.V., and Kerstein, J.J. (1989) How do Financial Incentives Affect Physician's Clinical Decisions and the Financial Performance of Health Maintenance Organizations?". The New England Journal of Medicine. 321 (2) 8-92.

Hutchinson, B., Birch S., Hurley, J.Lomas, J., and Stratford-Devai, F. (1995). Do physician - payment Mechanisms Affect Hospital utilization? A Study of Health Service Organizations in Ontario. CMAJ 154 (5) - 53-1.

Illich, I., I.K. Zola, J. McKnight, J. Chaplan and H. Saiken. Disabling Professions. London: Marion Boyars, 1977.

Inuvik Regional Health Board. (1995). Inuvik Region Profile of Needs. Inuvik: Inuvik Regional Health Board.

Labelle, R., Stoddart, G., and Rice, T. (1993) "A Re-examination of the Meaning and Importance of Supplier Induced Demand", McMaster University Centre for Health Economics and Policy Analysis Working Paper 93-2.

Lamberts, H. and Hofmans-Okkes, I (1995). Episodes of Care: A Core Concept in Family Practice. The Journal of Family Practice. 42 (2) 1 1-17.

Larned, D. "The Epidemic of Unnecessary Hysterectomy". In Seizing Our Bodies, edited by C. Dreifus, 195-208. New York: Vintage, 1978a.

MacLachlan L, (1983) Did the BEARP Panel Listen to Northerners?

Mathews, M. (1995). Identifying and Predicting Chronic Care Needs in the Inuvik Region, Northwest Territories. Masters thesis, University of Alberta, Edmonton, Alberta.

Mathur R, Barretto L, (1988), Northern Oil and Gas Action Program (NOGAP), Health Project Report.

Monsma, G. 1970. Marginal revenue and the demand for physicians' services. In Empirical studies in health economics, ed. H.F. Klannan, Baltimore; Johns Hopkins University Press.

Northwest Territories. (1995). Medical Care Act.

Pan, S., Geller, J.M., Muus, K.J., and Hart, L.G., (1996) "Predicting the Degree of Rurality of Physician Assistant Practice Location". Hospital and Health Administration 41(1) 105-119.

Plain, R. (1983). The Utilization and Economic Burden of Health Care Services In Alberta: Proposals for Reforming the System. University of Alberta.

Postl B.D., Moffat M., The Health of Canada's Native People, An Overview, 1988, Can. Fam. Physician, Vol 34.

Report of the Federal-Provincial Advisory Committee on Health Manpower (1983).

Rice, T.H. (1983). The Impact of Changing Medicare Reimbursement Rates on Physician Induced Demand. Medical Care. 1983 21(8) 803-815.

Robinson E, 1985, Mortality Among the James Bay Cree, Quebec 1975-1982, In R. Fortuine, ed. Circumpolar Health 84, 166-9.

Rodgers D.D., Suicide in the Canadian Northwest Territories, 1970-1980, Circumpolar Health 81, proceedings of the 5th International Symposium on International Health, 33: 492-6.

Sarsfield P., Baikie M., Dooley J., Orr P., and Roberts E., The Role of Non-Aboriginal Physicians Consultants to Aboriginal People, Arctic Medical Research, 1988, 47:Suppl.1, 385-87.

Sarsfield P., Health Issues in Northern Canada, Boreal Institute 1988, In Young, DE ed. Health Care Issues in the Canadian North, Occl. Pub. 26, 122-7.

Schaeffer O., Changing Morbidity and Mortality of Canadian Inuit, Chron Dis Can 1981, 2(2) p. 19-20.

Showstack, J.A. et al. Fee-for-service payment: analysis of current methods and their development. Inquiry 16: 230-246.

Territorial Hospital Insurance Service Board and The Department of Health. (1990). Health and Health Services in the Northwest Territories. Yellowknife: Government of the Northwest Territories.

Vayda, E. "A Comparison of Surgical Rates in Canada and In England and Wales". New England Journal of Medicine 289 (1973): 1224-29.

Wingert, T.D., Kralewski, J.E., Linquist, T., and Knutson, D.J. (1995). Constructing Episodes of Care from Encounter and Clinical Data: Some Methodological Issues. Inquiry. 33, 430-443.

Wotton, K.A., Mortality of Labrador Innu and Innuit, 1972-1981, In R. Fortuine, ed. Circumpolar Health 84, 139-42, Seattle: University of Washington Press.

Wotton, K. (1993) Orienting Physician Services to Community Needs - Review of Physician Services for the Inuvik Regional Health Board.

Wright, C. (1995) Physician Remuneration Methods: The Need for Change and Flexibility. CMAJ. 154 (5) 78-80.

Young, T.K., Health Care and Cultural Change, The Indian Experience in the Central Subarctic, 1988, University of Toronto Press